INSTEON Diagnostic Keypad

Owner's Manual

2993-xx2

INSTEON

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CAUTIONS AND WARNINGS

Read and understand these instructions before installing and retain them for future reference.

This product is intended for installation in accordance with the National Electric Code and local regulations in the United States or the Canadian Electrical Code and local regulations in Canada. Use indoors only. This product is not designed or approved for use on power lines other than 120VAC- 60Hz, single phase. Attempting to use this product on non-approved power lines may have hazardous consequences. Use only indoors.

In the Box	Tools Needed
INSTEON Diagnostic Keypad	INSTEON controllers to be tested
Tabletop Enclosure	
Manual	

Features

This INSTEON Diagnostic Keypad can be used to:

- Find and diagnose signaling issues
- Test the signaling quality of an installation
- “Stress” the house by running a distance test
- Intensively test signaling to a single device
- Remove guesswork for placement of Access Points specifically intended to communicate to RF-only devices

Installation

Before using the Diagnostic Keypad, follow the instructions that are included with the Keypad Tabletop Enclosure.

Test Button Descriptions

ON/OFF TOGGLE Sends on/off broadcast without confirmations to unit under test	**BEEP** Sends a beep message to unit under test (some responders will still beep even after unlinking from Diagnostic Keypad)**
REPORT* Monitors the quality of control signals from the device under test and beeps upon receipt of success reports	**TRAFFIC** Blink on valid traffic and long-beep upon collisions/noise
DISTANCE Sends alternating fast-ons and fast-offs to unit under test, beeping upon receipt	**LOCK/ UNLOCK*** Disable local setup of unit under test
RELINK* Relinks to last unit under test	**UNLINK*** Unlinks the unit under test

Note: Unit under test = last responder linked
*This feature only works with INSTEON devices shipped after March 2012 (i2CS).

**Only applies to devices shipped prior to March 2012.

Directions

Note:

- This manual presumes user has a moderate to expert understanding of INSTEON and INSTEON products.
- Diagnostic Keypad only contains a single link. When you are finished testing a device, be sure to UNLINK it from Diagnostic Keypad before linking your next device. If you link a second device without unlinking the first, it will overwrite the existing link and the first device will still contain a half-link to Diagnostic Keypad. The first device will have to be factory reset to remove the half-link.
- UNLINK device upon completion of test. Otherwise, the device under test will retain a responder link.

ON/OFF TOGGLE – Control Test

This button sends On and Off commands to unit under test.

ON/OFF TOGGLE	**BEEP**
REPORT	**TRAFFIC**
DISTANCE	**LOCK/ UNLOCK**
RELINK	**UNLINK**

1) Link Diagnostic Keypad as a controller of the unit under test.
2) Plug in Diagnostic Keypad at a test location.
3) Tap ON/OFF TOGGLE button.
   Responder will turn on or off.
4) Move Diagnostic Keypad to other outlets if/as desired.
5) If unit testing is complete, UNLINK device.

BEEP – Signal Test

This button sends a beep command to unit under test. This allows you to test devices you don't wish to toggle on and off and/or from locations where you can hear the responder's beep but cannot see the unit under test.

ON/OFF TOGGLE	**BEEP**
REPORT	**TRAFFIC**
DISTANCE	**LOCK/ UNLOCK**
RELINK	**UNLINK**

1) Link Diagnostic Keypad as a controller of the unit under test.
2) Plug in Diagnostic Keypad at a test location.
3) Tap BEEP button.
   Responder will beep (unless signal does not reach responder).
4) Move Diagnostic Keypad to other outlets if/as desired.
5) If unit testing is complete, UNLINK device.

REPORT Mode

This test allows you to monitor the quality of control signals from the device under test and is commonly used to commission an installation. This mode does not require any links.

ON/OFF TOGGLE	**BEEP**
REPORT	**TRAFFIC**
DISTANCE	**LOCK/ UNLOCK**
RELINK	**UNLINK**

1) Plug in Diagnostic Keypad at a test location.
2) Tap REPORT button until its LED is illuminated.
3) Activate scenes from as many devices as you wish.
   Keypad will beep at beginning of scene message.
   *Keypad will double-beep upon receipt of success report with no errors.**
   *Keypad will long-beep upon receipt of success report with errors.**

**The success report feature was released in devices shipped after March 2012.*
A small number of INSTEON devices do not support this feature.

The delay between the beep and double-beep will vary depending on the number of responders in the scene.
- The delay for each responder is approximately 0.2 seconds (10 responders ~ 2 seconds).
- If the delay is longer, it may be an indication of difficulty in communications to one or more responders.

TRAFFIC – Corruption and Noise Monitor

This test allows you to monitor in-band noise and INSTEON traffic on the powerline. This does not require any links.

ON/OFF TOGGLE	**BEEP**
REPORT	**TRAFFIC**
DISTANCE	**LOCK/ UNLOCK**
RELINK	**UNLINK**

1) Plug in Diagnostic Keypad at a test location.
2) If button LED is not illuminated, tap the TRAFFIC button.
3) Observe TRAFFIC button LED for a few moments or minutes.
   LED blinks indicate valid INSTEON messages.
   Keypad will emit a long beep upon each corrupted message (commonly caused by collisions/noise).
4) Initiate a scene from an INSTEON controller.
   LED will blink during valid INSTEON traffic.
   Excessive blinking is caused by message failures, commonly from a scene responder

member that is no longer active.

5) Move Diagnostic Keypad to other outlets if/as desired.

If beeping is frequent, you may have a device generating noise. Move Diagnostic Keypad around until the beeping occurs most frequently and you should be close to the source. Try turning off devices one at a time until noise subsides, then install a FilterLinc to isolate network from noise source.

Another means of locating a noise source is to add the DISTANCE test (see below) to a TRAFFIC test. This is especially helpful in locating noise sources in smaller and less busy installations.

DISTANCE Mode

1) Plug in Diagnostic Keypad at a test location.
2) Tap REPORT and TRAFFIC buttons until their LEDs are off.
3) Tap DISTANCE button until its LED is off.
4) Link the Diagnostic Keypad as a controller of the unit under test.
5) If unit under test should not be turned on and off rapidly, tap UNLINK button.
6) Tap DISTANCE button until LED is on.
   Keypad will send fast-on and fast-off commands as quickly as possible.
   Unit beeps upon receipt of acknowledged commands.
   Faster beeping means better communication.
   Four beeps/second indicate responder hearing message directly (0 hops).
   Two beeps/second indicate responder 3 hops away.
7) Important: upon test completion, tap DISTANCE button until LED is off.
8) If testing the unit under test is complete, UNLINK device.

ON/OFF TOGGLE	BEEP
REPORT	TRAFFIC
DISTANCE	LOCK/ UNLOCK
RELINK	UNLINK

LOCK/UNLOCK

This button allows you to disable (or re-enable) local setup of unit under test. (This feature is in all products shipped after March 2012.) LOCK/UNLOCK prevents accidental changes being made to on-level, ramp rates, etc. To determine whether local setup is enabled on a device, press and hold its Set button for 5 seconds. If its LED starts blinking, local setup is enabled; tap Set button until LED stops blinking.

1) Link Diagnostic Keypad as a controller of the unit under test (device to be locked or unlocked).
   Note: You cannot UNLINK a device from Diagnostic Keypad unless it was the last device linked before programming lock was enabled. If another device is still linked to Diagnostic Keypad, remove the link by using home automation software (such as HouseLinc) or performing a factory on the device.
2) Tap LOCK/UNLOCK button.
   a. If LED is on, you have locked/disabled local setup.
   b. If LED is off, you have unlocked/re-enabled local setup.
3) Tap again if device is not in the desired mode.
4) If unit testing is complete, UNLINK device.

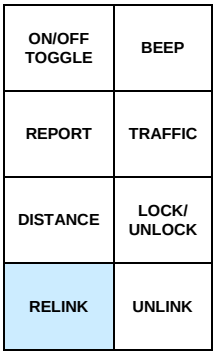
ON/OFF TOGGLE	BEEP
REPORT	TRAFFIC
DISTANCE	**LOCK/ UNLOCK**
RELINK	UNLINK

Note: *If you LOCK a unit under test and then link Diagnostic Keypad to another device, Diagnostic Keypad cannot UNLOCK the first unit under test. You will need to use software (such as HouseLinc) to UNLOCK it or perform a factory reset.*

RELINK

This is a convenient feature that quickly relinks a device under test when you have unlinked it and disabled its local setup. It is also handy to re-link to a device at a different level/state.

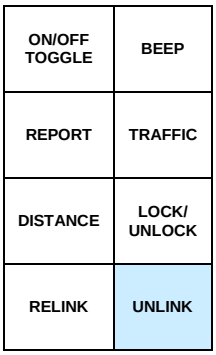
1) Tap RELINK button to relink Diagnostic Keypad to unit under test.



UNLINK

Unlinking is important when testing is complete on any device.

1) Tap UNLINK button to remove link from unit under test.



Common Problem Solving Techniques

Testing RF-Only Devices for Access Point/Dual-Band Device Placement

- Place the RF-only device in the desired location.
- Plug Diagnostic Keypad into the desired outlet.
- Link Diagnostic Keypad as a controller of the RF-only device.
- Put the RF-only device into linking mode again.
    - It will remain in that mode and be testable for approximately 4 minutes.
- Use DISTANCE mode to test communications to the RF-only device.
    - If the communications are consistent, the Access Point/dual-band device is in a good location.
    - If the communications are not consistent, relocate either the RF-only device or the Access Point/dual-band device and retest.
        - If you relocate the Access Point/dual-band device, move Diagnostic Keypad with it.

Locating Noise Problems

- Enable TRAFFIC mode (disable REPORT and DISTANCE).
- Activate scenes from various locations (or activate DISTANCE mode to create traffic).
- If you hear more beeps, that means more noise in the INSTEON band.
    - Beeping indicates bad CRC (a message in which the Cyclic Redundancy Check indicates that there is at least one incorrect bit in the message).
- Move the tester to different outlets throughout the house to find the outlet with the closest proximity to the noise source (Diagnostic Keypad will emit the fastest beeping).
- With the tester plugged in, try removing devices that might be a source of noise (e.g., power supplies, laptops, chargers or video game consoles).

- When you have identified the noise source, install a FilterLinc to isolate the noise source from the INSTEON network.

Determining Source of Signaling Problems

- A problem area would be an outlet in which the tester has difficulty talking to the unit under test.
- Enable DISTANCE mode.
- Search the following list for your situation:
    - No beeping and no On/Off of the device under test.
        - Make sure device under test is linked as responder to Diagnostic Keypad.
        - There may not be a signal path between Diagnostic Keypad and device under test.
            - Confirm phases are coupled.
            - Add dual-band INSTEON products if necessary.
        - There may be noise at/near the device under test.
            - Find and filter the noise-making device with a FilterLinc.
    - No beeping, but the device under test goes on and off.
        - The device under test is receiving the commands but the Diagnostic Keypad is not receiving the device's positive acknowledgement that the command was received.
        - Look for noise at the Diagnostic Keypad's location. Move Diagnostic Keypad if necessary.
    - Beeping, but the device under test doesn't go on or off.
        - Acknowledgement may be coming from a different unit. Link to intended device under test.
        - Try moving Diagnostic Keypad to a different location and using ON/OFF TOGGLE to turn the device on and off.
        - Confirm that the device was not linked at off. Turn the device on using its local switch, then press the ON/OFF TOGGLE button and verify if the device under test turns off but not on. If linked to off, relink Diagnostic Keypad with device under test set to on.
    - The beeping on/off cadence is slower than other outlets.
        - The path to the device under test is longer, but this may not be a problem.
        - If the beep cadence is consistent, it's likely not a problem.
        - As you use the Diagnostic Keypad, you will be able to more easily recognize the beep patterns.
    - The on/off beeping is spotty at best.
        - The path to the device under test is poor.
        - Add additional dual-band INSTEON devices to couple the phases.
        - There may be noise in the path. Find and filter the noise-making device with a FilterLinc.

Specifications

General	
Product name	INSTEON Diagnostic Keypad
Brand / manufacturer	INSTEON
Manufacturer product number	US: 2993-222 EU: 2993-422
UPC	813922012699
FCC ID	SBP23342
Industry Canada	5202A-23342
Warranty	2 years, limited
INSTEON	
INSTEON powerline mesh repeater	Yes
INSTEON RF mesh repeater	N/A, powerline only
INSTEON controller	Yes

INSTEON responder	N/A
Maximum links / scenes	1
LED	White when a particular test mode is active.
LED brightness	Constant
Local control	N/A, not a load controller
Commands supported as controller	On, Off, Beep
Commands supported as responder	N/A, not a load controller
RF range	N/A, powerline only
Phase bridge detect beacon	N/A, powerline only
X10 – not supported	
Mechanical	
Mounting	Tabletop enclosure
Wires	Standard lamp cord
Screw clamp connections	N/A
Case color	White
Set button	1
Plastic	UV stabilized polycarbonate
Beeper	Yes
Beep on button press	N/A
LED	White
Operating environment	Indoors
Operating temperature range	32 ^{o} to 104 ^{o} F
Operating humidity range	0-85% relative humidity
Electrical	
Voltage	2993-222: 110VAC (+/- 10%) 2993-422: 240VAC (+/- 10%)
Frequency	50/60Hz
Load type(s)	N/A, not a load controller
Maximum load	N/A, not a load controller
Minimum load	N/A, not a load controller
User replaceable fuse	N/A
Hardwired remote control	N/A
Retains all settings without power	Yes, saved in non-volatile EEPROM
Standby power consumption	< 1 watt
FCC ID	N/A, powerline only
Safety approval(s)	ETL (Intertek Testing Services)

Certification and Warranty

Certification
This product has been thoroughly tested by ITS ETL SEMKO, a nationally recognized independent third-party testing laboratory. The North American ETL Listed mark signifies that the device has been tested to and has met the requirements of a widely recognized consensus of U.S. and Canadian device safety standards, that the manufacturing site has been audited, and that the manufacturer has agreed to a program of quarterly factory follow-up inspections to verify continued conformance.

ETL/UL Warning (Safety Warning)
CAUTION: To reduce the risk of overheating and possible damage to other equipment, do not install this device to control a receptacle, a motor-operated appliance, a fluorescent lighting fixture, or a transformer-supplied appliance.
Gradateurs commandant une lampe a filament de tungstene – afin de reduire le risqué de surchauffe et la possibilite d'endommagement a d'autres materiels, ne pas installer pour commander une prise, un appareil a moteur, une lampe fluorescente ou un appareil alimente par un transformateur.

Limited Warranty
Seller warrants to the original consumer purchaser of this product that, for a period of two years from the date of purchase, this product will be free from defects in material and workmanship and will perform in substantial conformity to the description of the product in this Owner's Manual. This warranty shall not apply to defects or errors caused by misuse or neglect. If the product is found to be defective in material or workmanship, or if the product does not perform as warranted above during the warranty period, Seller will either repair it, replace it, or refund the purchase price, at its option, upon receipt of the product at the address below, postage prepaid, with proof of the date of purchase and an explanation of the defect or error. The repair, replacement, or refund that is provided for above shall be the full extent of Seller's liability with respect to this product. For repair or replacement during the warranty period, call INSTEON at 800-762-7845 with the Model # and Revision # of the device to receive an RMA# and send the product, along with all other required materials to:

INSTEON
ATTN: Receiving
16542 Millikan Ave.
Irvine, CA 92606-5027

Limitations
The above warranty is in lieu of and Seller disclaims all other warranties, whether oral or written, express or implied, including any warranty or merchantability or fitness for a particular purpose. Any implied warranty, including any warranty of merchantability or fitness for a particular purpose, which may not be disclaimed or supplanted as provided above shall be limited to the two-year of the express warranty above. No other representation or claim of any nature by any person shall be binding upon Seller or modify the terms of the above warranty and disclaimer.
Home automation devices have the risk of failure to operate, incorrect operation, or electrical or mechanical tampering. For optimal use, manually verify the device state. Any home automation device should be viewed as a convenience, but not as a sole method for controlling your home.

In no event shall Seller be liable for special, incidental, consequential, or other damages resulting from possession or use of this device, including without limitation damage to property and, to the extent permitted by law, personal injury, even if Seller knew or should have known of the possibility of such damages. Some states do not allow limitations on how long an implied warranty lasts and/or the exclusion or limitation of damages, in which case the above limitations and/or exclusions may not apply to you. You may also have other legal rights that may vary from state to state.

U.S Patent No. 7,345,998, International patents pending (see www.insteon.com).
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